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Economic History and Institutions Dept.
Universidad Carlos III de Madrid
Calle Madrid 126
28903 Getafe (Spain)
Fax (34) 91 624 9574

SPANISH MONARCHY´S MONETARY PROBLEMS IN THE SEVENTEENTH CENTURY: SMALL CHANGE AND FOREIGN CREDIT

Carlos Álvarez[+]

Abstract

It is well known that the Spanish Monarchy found out some problems in its monetary system. So far, almost all the studies have been concentrated in the billon problem and inflation. However, small and large silver coins had also problems to circulate together in Castile. Without small change, among other consequences, it was more difficult to carry out small transactions and without large denominations the credit borrowed by the king to foreign bankers was more expensive. These problems were endogenous to the Castilian monetary system based on precious metals. Those problems were aggravated with the inflation of copper currency and the new war scenario in Flanders during the seventeenth century.

The Monarchy took decisions against the market in order to avoid those problems. These measures did not solve the problems, but they affected the fineness of the currency, the price of transactions and the relationship between the Council of Finance and its foreign bankers.

Theory helps to explain why those problems were intrinsically related to the Castilian monetary system. New historical evidence shows that the outcomes of the Crown's solutions to control the number of small coins and to eliminate any premium on large coins are in line with predictions of new developments in monetary theory.

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[+] **Álvarez**, Economic History and Institutions Dept. Universidad Carlos III de Madrid.
E-mail: canogal@clio.uc3m.es

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> "… and the debtors are able to pay their debts using every silver coin they want, because the large and the small coins have to be the same quality regarding to their fineness and weight. For that, eight coins of one reals have the same weight than one coin of eight reals, and four, the same than one of four reals, so then, there is no reason to make differences between values of those coins". AGS CJH 632. Consulta del Consejo de Hacienda, August 30, 1627.

Introduction

Every market needs different sizes of coins for different kind of businesses. Having different denominations helps to increase transactions and commerce where cash is a very important mechanism to trade. The combination of small and large coins helps to trade goods with different values. It would be difficult to buy small amounts or cheap things only with large coins, and the same would happen with expensive goods using only small denominations. It is necessary to have an equilibrium in the stock of different coins in order to get all kind of transactions[1]. If the process of coinage depends on free choices of people and mints, there will be a lot of problems to have enough number of fractional coins circulating.

The circulation of coins with different denominations in monetary systems based on precious metals was always problematic, even for coins made with the same metal[2]. It has been observed that money holders prefer to strike high denominations, even when it could leave the public with a short of small change[3]. Each coin has two different values: the intrinsic value from the metal used to mint it and the nominal value that the government gives up to the coin. Keeping both values together is difficult and it could cause distortions in the stock of some groups of coins.

Another problem is that individuals have different preferences about coins in order to use or save them. It increases the value of some coins with respect to others, even though all were issued using the same sort of precious metal. Those agents' preferences modify the rate of exchange among them, leaving their official value without effect. The difference between legal and unofficial rate could be caused by a higher demand of some coin in the market

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[1] Cipolla, (1956), pp. 33-34. Munro (1975), pp. 302-345.

[2] Sargent and Velde (2002).

related to the other one. This process is supposed to be temporal because it would incentive people to mint more valuable coins increasing its supply.

However, if the monetary system is not close and coins can leave the country, then the equilibrium will also depend on the demand of "good" coins outside. If that demand is larger than the amount minted inside and the coin is exported permanently, the equilibrium will never be reached. There will always be a difference between the legal and the unofficial rate of exchange.

Both problems are relevant because they can break the stock of some coins and the rate of exchange among them initially established by the government. The Spanish Monarchy faced both problems during the seventeenth century and tried to solve them in many different ways, not always correctly. It was some kind of experimentation inside of its monetary system.

There is a great debate about the determinants of acceptability among different types of money and also about who establish their real market value[4]. Why a commodity is accepted as money? Which are the mechanisms to determine the value of that commodity used as money in terms of units of account? It is well known that the basic characteristic of any good used as medium of exchange is acceptability to the economy agents. That acceptability of a specific asset may depend on several variables reflecting the nature of the transaction. The main premise is that some kinds of money were accepted as medium of exchange when agents wished to take them as such.

This paper will argue that the Spanish Monarchy ignored this premise and thought that precious metals and its own authority were enough to govern its monetary system. This paper shows that the value of coins does not depend only on the legislation but either on the intrinsic value of coins. Acceptability and market value of any asset accepted as money will come from the conditions of the market and the own preferences of the agents. The big mistake of the Spanish Monarchy was to ignore these principles in the seventeenth century.

Usually, it has been considered that the precious metal was a warranty of stability in the old metallic monetary systems in Europe because of the intrinsic value of the metal used to mint coins. A bimetallic monetary system might have more problems because the rate of

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[3] Grierson (1976), p. 113.

[4] Cuadras-Morató and Rosés (1998), pp. 28-29.

exchange between silver and gold could change as commodities depending on their offer and supply. According to this idea, a monometallic monetary system would be a system with a higher stability. This paper shows that keeping the official nominal value of coins over time could be difficult even within a monometallic monetary system and it caused problems to the foreign credit of the Monarchy.

Theoretical search models of money explain how intrinsic characteristics of money, such as durability, kind of metal, homogeneity, etc., might be desirable but are unnecessary for a good to fulfill the role of medium of exchange and it is not either the reason for maintaining stability among denominations in the market[5].

The paper studies the factors that made the circulation of small silver coins in equilibrium with large coins in Castile something very difficult. The problems were not only related to the agent's preferences, but also to the goals of the Monarchy in the credit negotiation with its bankers.

So far, even the huge amount of historical evidences about differences of value among denominations in Castile, it has not been calculated yet which was the premium of large silver coins over the small change. This paper presents an estimation drawn from a couple of different sources. First, a proposal made by the Council of Finance to the king explaining the causes of this problem and how to solve it. Second, the records of a private business company of Seville that had to buy large coins in order to send several amounts of silver to Madrid. Other sources are the discussions inside the Council of Finance about small and large coins of silver and the obstacles found to pay foreign bankers with different denominations. Members of the government argued that bankers rejected the legal nominal value of small silver coins as a strategy to bargain credit with the Monarchy, taking advantage of its desperate necessity of financial services in Europe. However, the monetary theory and data available in different archives confirm that large coins had a higher value in the marketplaces and the banker's demands about to be paid with large coins were based on a real difference among denominations.

Section I offers a brief description of the Castilian monetary system regarding silver coins and different denominations. The monetary model used in this paper to discuss problems with small change in Castile is outlined in Section II. Section III describes the

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[5] Kiyotaki and Wright (1989), Wright (1995) and Cuadras-Morató (1994).

problems to have circulation of small silver coins and presents an estimation of large coins' premium. This section uses historical evidence to show how well the assumptions and predictions of the model were accomplished in Castile during the seventeenth century. Section IV shows the decisions against the market applied by the Monarchy to solve those problems, explains why they did not work out and their real effects on the monetary system and the credit negotiation. The conclusions of this paper are presented briefly in Section V.

I. Silver and copper in the monetary system of Castile

The Catholic Kings settled down the monetary system of Castile in 1497, reforming deeply the chaotic medieval system[6]. The Habsburg dynasty maintained this new system almost without changes for more than 200 years[7]. It was a bimetallic system based upon gold and silver. The basic coin for the gold was the ducat, the "real" was the silver unit and the abstract unit of account was the "maravedi". A "real" was 34 maravedis worth and a ducat was equivalent to 375 maravedís[8].

The basis of the Spanish system was the Castilian pound, equal to ca. 460 grams, divided into 16 ounces. Half a pound of silver - 8 ounces or 230,0465 grams- was called a silver mark. This was the unit of weigh for minting gold and silver. The fineness of a silver mark before being coined had to be in Castile "11 dineros and 4 granos" (930,555 milésimas). This proportion did not change until 1728, when it was reduced to just 11 dineros (916,666 milésimas).

A mark of "11 dineros and 4 granos" yielded 67 reales of 3,4335 grams each one. However, the owner of the silver only received 64 reales from the mint. A couple of reales served to pay the cost of production in the mint (bracceage) and the other one was charged by the king (seigniorage)[9]. The metal brought to the mint to be coined by order of the king

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6 MacKay (1981).

7 The more important modification introduced in the 16th century was that King Charles I substituted the *escudo* for the *ducado* as the basic gold coin in 1537. Garcia de Paso (2000b).

8 Hamilton (1983, 1988), Pérez García (1990), Serrano Mangas (1996), Santiago (2000).

9 Burzio (1958). pp. 29-35. Veitia y Linaje gives other percentages but the amount received by people after minting the silver was the same. According to Veitia, the seigniorage of a mark of silver was 50 maravedís and the cost or bracceage, including the "Ensayador" and "Fundidor Mayor" rights was 40,4 maravedis. Veitia y Linaje (1672), Libro I, Capt. XXXIII, n. 13 and 17.

was exempted[10]. There were deviations in the fees collected by different mints because they were private businesses and they had to compete in the market to attract clients[11].

The silver coins in circulation were multiples and submultiples of the real (table 1). Not all mints coined the same coins, but the Crown tried to keep the equilibrium among all denominations because it was necessary for the commercial sector of the economy. Nevertheless, the fee charged by the mint was the same weather the owner coined one mark of silver into "reales de a ocho" or he preferred "sencillos".

Table 1. Kinds of silver coins and their value in reales and maravedís.

Denominación	reales	maravedís
real de a ocho, duro, peso fuerte	8	272
real de a cuatro o "tostón"	4	136
real de a dos o "peseta"	2	68
real o sencillo	1	34
medio real	0.5	17
cuartillo o cuarto de real	0.25	8.5

Fuente: Burzio (1956), p. 292.

The purchasing power of each coin was based on its value in terms of maravedis. All coins had an equivalent value in units of account, based on its amount of silver. It meant that a "real de a ocho" had the same value than four "real de a dos", or two "reales de a cuatro", because the three cases had the same amount of silver.

The monetary systems of Castile permitted people choose the moment to melt or mint coins. The mints were private and independent business but they operated under government regulation. At the beginning of the reign of Philip II (1556) there were eight mints in Castile (Seville, Segovia, Toledo, Valladolid, Cuenca, Burgos, Granada and La Coruña), although not all of them were continuously active[12]. A second and very important mint was built in Segovia in 1586.

The nominal and intrinsic values of coins were the variables used by the government in order to maintain silver and gold in circulation. When the value of some coin in terms of commodities was higher than the value given to the raw silver, people converted precious metal into coins, paying the cost of producing them (bracceage) and the taxes charged by the king (seigniorage). It allowed the people to increase their purchasing power. On the contrary,

[10] Ulloa (1975), p. 460.

[11] Usher (1943), p. 223.

if the coins were less estimated in units of account than the raw silver, people preferred to melt the coins and to use the raw metal. In this case, the government had to increase the nominal value of the silver coins in units of account or to reduce the official amount of silver in each coin in order to stop the melt process.

However, the Monarchy was unable to convince people to mint coins of every size. It was observed that mints produced many big coins and very few small ones. The small silver coins fell into short supply, causing problems in the marketplaces of Castile. There was a great demand of small coins for day-to-day trading.

The same problem happened in late-medieval Flanders (1334-1484). In terms of the proportion of total silver bullion minted, the amounts of petty coins struck were rarely more than 1 percent until the mid-fifteenth century[13]. It was precisely the kind of coins that the bulk of the public needed for their daily bread and drink. In Central Europe there was a similar reaction when the silver content of small coins was fixed at too high rate in 1559. The minting of small coin gradually slackened[14]. Mexico, a big producer of silver in the world, faced a similar problem with small coins and it was necessary to legalize the circulation of cacao as coin since 1555[15].

To avoid this problem in Castile, the king introduced a coin called billon, made of copper and a small part of silver, during the sixteenth century[16]. This coin had different fractions in order to provide enough change to the public. It was an experiment of fiat currency in the sixteenth century with the elements of the standard formula defined by Cipolla. Almost three hundred years before it had been applied in England. These coins had a commodity value lower than their monetary value; their quantity was strictly limited in circulation in order to maintain the premium, and the government provided convertibility with the rest of currency[17].

The basic billon coin was called “blanca” and it had a nominal value of 0.5 maravedis in terms of units of account. Despite of having less silver than the regular silver coins, its

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12 Ulloa (1975), p. 459.

13 Munro (1989), pp. 33, 50-53.

14 Zimyani (1975), p. 399.

15 González Gutierrez (1997), p. 206.

16 Santiago (2000), p. 36-39. Motomura (1994).

17 Cipolla (1956), p. 27. Sargent and Velde (2001), p. 12.

purchasing power was the same than them. It was established not only by Castile's legislation but also accepted by the market. The billon was always convertible to silver with an exchange rate fixed by the government. It means that sixty-eight "blancas" (34 maravedis) were equivalent to a real of silver (34 maravedis). The net profit of producing a blanca was 10 percent, something very profitable for the Monarchy[18].

The circulation of these coins in the market was not easy. There was alternate periods of shortages of copper-silver coins and excessive coining, depending of cost and net gains[19]. Nevertheless, the supply of this sort of coins helped the Castilian markets with the small transactions. Merchants and others receiving such billon coins in trade were presumably willing to accept them although they had smaller silver content because of their higher utility in effecting day-to-day payments. The copper coins suffered several changes but they continued having similar proportions of silver and copper until 1596[20].

However, given the high net profits that the coinage of billon had for the Monarchy, Philip III decided to eliminate the silver from the billon coinage and to produce large amounts of them in order to increase his revenues. Since then, its circulation grew very quickly. It sent silver currency off the domestic monetary circulation and silver got a premium in terms of cooper coins[21]. Since 1625, each time a person wanted to buy something with copper coins, she had to pay an unofficial percentage more if its price was fixed on silver because of the different market value of both kinds of coins.

The damage caused by this effect in the monetary system of Castile during the seventeenth century is well known[22]. As a consequence, people lost its confidence about the billon coins that were working like small coins in the markets. Given the uncertainty about their value in the future, people preferred to be paid with silver coins or assets convertibly on silver. It caused again the necessity of new small coins. But minting silver was a free decision. Did people will to mint raw silver into small silver coins in Castile?

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18 García de Paso, (2000c).

19 Santiago (2000).

20 Some changes during the sixteenth century were made to increase the number of small coins. García de Paso, (2000b), pp. 8-10.

21 Serrano Mangas (1996), pp. 53-135. Appendix I shows the evolution of this premium between 1618 and 1668.

22 Motomura (1994, 1997). Serrano Mangas (1996). García de Paso (2000a).

II. A monetary model

Recently, Sargent and Velde have developed a model that permit to analyze the problems faced by a monetary authority in order to get small and large coins[23]. They use this model, among other subjects, to explain the Castile's problem with copper coins. Their research shows how billon worked and its own limits, and also why the solutions adopted by the Monarchy to keep silver value in terms of copper coins were useless.

This paper will try to show that the same model is also very useful to understand Castile's problems with circulation of small silver coins and how these problems affected the credit negotiation between the Monarchy and its bankers. A problem that the members of the Spanish Monarchy Councils were not able to understand, it became now something easy to explain.

The model assumes several features that were accomplished by Castile's monetary system during the sixteenth and seventeenth century:

1.Coins are made of some valuable metal: silver or gold. The government decides the amount of metal that each coin contains (b).

2.Coins circulate by "tale" not by weight. This means that the prices of goods are posted in number of coins per good, rather than units of silver weight per good. A coin can buy more goods than would the silver within the coin.

3.The metal content of coins puts an upper bound on the price level (number of coins per consumption good), because although coins can be worth more than the intrinsic value of the silver they contain, they cannot be worth less. People can costless melt the coins to retrieve the silver. The price level p must obey:

$$p \leq y.$$

y = units of metal weight per good / units of metal weight per coin.

4. There is an unlimited minting in which citizens are free to purchase coins for silver at the mint at a set price of coins per unit metal. For example, for each ounce of silver, the mint offered (1-S) / b coins.

The unlimited coinage regime of Castile put a lower and upper bound on the price level. If the price level were to fall bellow 'p', people had the incentive to bring precious metal to the mint to purchase coins, which would increase the stock of coins. If the price were

strictly between "coining point" (left) and "melting point" (right), the stock of coins would not change. There would be neither melting nor minting of coins. By making the range narrow, a commodity money system links the price level to the relative price of consumption goods in terms of metal.

"coining point" "melting point"

$$y1(1-S1) < ey2(1-S2) < p < y1 < ey2 \quad (1)$$

Table 2. Variables.

Variable	Meaning	Units
b1	Intrinsic content of small coin	oz silver/ small coin
b2	Intrinsic content of big coin	oz silver/ big coin
y1	Nominal value of small coin	small coin/ consumer good
y2	Nominal value of big coin	big coin/ consumer good
S	Cost and seigniorage rate	
e	Exchange rate	small coin/big coin
p	Price of consumer goods	small coin/consumer good

For the conversion of bullion into coin can never be costless, and can be undertaken only so long as the current coin commands a premium over bullion sufficient to cover those minting costs. Normally coins of all denominations will command such a premium, because transacting trade and effecting payments is so much more convenient in legal tender coin than in raw bullion, which necessarily has to be assayed and weighed to ascertain its market value. If that premium ever fell bellow the sum of brassage and seignorage, bullion would cease to flow to the mint: requiring the prince either to reduce the mintage fees or to increase the trade value of bullion, and thus the coinage premium by a debasement[24].

In this system different denominations of coins are perfect substitutes. Because coins do not pay nominal interest, denominations have identical rates of return if the exchange rates (e) among them are constant over time.

However, it did not mean that the market is always going to accept it. Actually, people had preferences about different denominations and it was reflected in shortages of the best one. The reason was that not all denominations bear identical rates of return, even though they have equivalents amount of precious metals, so some of them would present an advantage to holding rather than the other. The Sargent and Velde's model predicts shortages of small coins when their rates of return are less than large ones, dissolving

[23] Sargent and Velde (2002).

[24] Feavearyear (1963), pp. 10-20, Munro (1973), pp. 11-42.

people's indifference about denominations[25]. The market manages a shortage by giving a low return to small coins temporarily, producing a permanent effect on 'e'. It was called unofficial "premium".

The silver premium related to the copper currency was caused by the uncertainty about its value as consequence of continuous changes, melting and coining process, while the premium of large silver coins regarding to the small ones was related with the higher value that large coins had in the market because of their multiple uses. For example, they were the preferred coins to export silver to Europe.

III. Small and large silver coins in Castile: problems for the market and also for the Monarchy

Small and large coins had different uses in the market and a different cost when they were minted in the mint. The Spanish Monarchy had problems to incentive the production of small silver coins in Castile. The Council of Finance noted many times that small coins were avoided and the mints did not produce an enough number of them.

Merchants complained about the shortage of small coins frequently because it did harder to buy and sell things of small value or quantity. People's daily life and the development of markets depended on having enough means of payment. Credit could help to reduce the lack of small coins but it had other kind of problems and higher transaction costs.

At the same time, the convenience of increasing the number of small silver coins was not only seen as something useful for small transactions. True or not, the Council of Finance was convinced that it could also help to stop the exports of silver out of Castile:

> "… the currency, how much divided it is in small coins, more profitable is for the kingdom and more difficult to exit the country, because a "real de a ocho" only can have a holder, but if this coin is minted in "sencillos" could be hold by eight persons, and if it would be done in "medios reales", then by sixteen, and everybody would receive benefits for it. Moreover, it makes much difficult to collect silver in order to bring it out from the kingdom. V.Mj. knows how important is to retain silver in the kingdom as much as possible, doing everything we can to get it"[26]

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[25] Sargent and Velde (2002), pp. 21-30.

[26] Archivo General de Simancas (AGS), Consejo y Juntas de Hacienda (CJH), 632. Consulta, August 30, 1627.

Scarcity was not the only problem of small silver coins in Castile. They had a different rate of exchange ('e') that the rate established by the Monarchy. The large types of silver coins, also called "plata doble" (table 3), were more valuable than the small ones. The market gave a premium to the large coins, showing its estimation, similar to the premium over the billon[27]. It had to be paid when people made transactions where large coins were required in the payment. The contracts set up the value of a transaction in maravedis and also specified what kind of silver coin had to be used to pay it.

Table 3. Denomination of silver coins in the contracts

Name of coin	reals	size	
peso, real de a ocho, duro, peso fuerte	8	"plata doble" or "gruesa"	large
real de a cuatro o "tostón"	4	"plata doble" or "gruesa"	large
real de a dos o "peseta"	2	"sencilla"	small
real o sencillo	1	"sencilla"	small
medio real	0.5	"sencilla"	small
cuartillo o cuarto de real	0.25	"sencilla"	small

Problems to mint small silver coins

The Sargent and Velde's model shows that it is very difficult to avoid misalignments in the equation (1), even reducing to zero the production cost and seigniorage taxes (both included in S) (table 2). Production cost per coin depends on the kind and size minted. Evidently, the small coins (coin 1) are more expensive to manufacture than large ones (coin 2), because they take much labor and time to strike in the mint, then S1 > S2, and the conclusion is that the intervals cannot coincide.

When S1 > S2, if the monetary authority aligns the right limits in the equation (1) by setting ey2=y1, it implies ey2(1-S2) > y1(1-S1). This inequality implies that the small denomination will not be minted. This was exactly that was happening in Castile during the period of time this paper studies. The law established that ey2=y1, where 'e' was a constant rate of exchange between small silver coins and large ones or the mint equivalence, e=y1/y2. This constant rate of exchange depended exclusively on the amount of silver of both coins.

It means that the purchasing power of both coins, small and large, were the same, independently of their denomination, it was only based on the amount of silver inside each

[27] Serrano Mangas (1996).

coin. A "peso de a ocho" or a "real de a ocho" had the same amount of silver than four coins of two "reales", or two coins of four "reales". Then, the purchasing power had to be the same for the three groups of coins.

However, people realized that the cost of minting coins was different, depending on their size. Minting small coins was more expensive rather than large coins because, at least, it demanded more time and work[28]. According to Grierson, "twelve times as much labor was involved in making 12 pennies as in making one shilling" in the structure of the English medieval coinage[29]. For that reason, they did not have an incentive to mint small coins paying more when they would get the same value with the large ones. If people did not pay the extra cost of issuing small coins, the mint had to pay it.

The Crown could raise the cost of minting big coins to match the cost of small ones. In this case, the Monarchy and the mint will be more interested in minting big ones because it would increase their revenues from bracceage and segnoirage. However, the government's ability to set minting costs, S2, above its real production costs would have limits. It would be the price charged by other countries. If the cost was too high, it would incentive people to coin silver in another country.

In order to avoid this effect, the Spanish Monarchy could not increase the cost of S2 too much, but then, the mint had to pay the extra cost of producing small coins in case they had to be minted. It encouraged mints to avoid small coins. Historical data show that this was the way addressed by the Spanish Monarchy. It would explain why the majority of silver was permanently minted in large coins, and why the small silver coins were always very scarce in Castile. For example, Hamilton asserts: "It was more convenient for the mint workers to coin reales of large denomination instead of the small ones. They obtained more profits issuing a coin of eight reales than "sencillos" (one real), because the mint prices were the same for a mark of silver, independently the kind of coins produced"[30].

To control the preferences of the silver owners or the mints, the Spanish Monarchy decided to issue laws fixing the amounts of coins that the mint had to issue for each

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[28] The manufacture of small coins is not always the most expensive. It could depend on kind of technology used by the mint. For example, during the Carlos I's reign, Mexico received authorization to issue "reales de a ocho" two years after starting to coin small silver coins. The mint avoided that coin because with the old manual system "de martillo" was very low, expensive and unaffordable. The large coins did not start to circulate in Mexico until 1572. González Gutierrez, (1997), p. 189.

[29] Grierson (1979), p. 113. Spufford (1970), pp. 44-46, for the Burgundian Low Countries.

denomination. The same as the Monarchy set up the tale characteristics of the coins, also assigned to the mints the proportion of each kind of coin[31]. For example, in 1588 the Council of Finance found out that the mints only minted big coins: "reales de a ocho" and "reales de a cuatro". That same year, Philip II ordered to the mints that the private silver have to be issued by 50 percent in "reales de a dos", 40 percent in "sencillos", and the rest 10 percent in "medios"[32]. It is suppose that the Crown reserved only by itself the right to issue big coins. Of course, mints did not accomplish this law, leaving the market without small change.

Other different way to solve this problem is debasing the small coin (raising y1=nominal value of coin 1) or reducing the amount of silver in each small coin, 'b1', while maintaining unchanged its nominal value. If the increase of 'y1' is large enough to overcome the effect of a more expensive cost of producing small coins, then it will be profitable to mint them.

$$ey2(1-S2) < y1(1-S1) < p < y1 < ey2$$

The Spanish Monarchy used this mechanism during the sixteenth century introducing the cooper and silver coin in order to have a permanent stock of small-value coins. The new coin contained a small amount of silver and great proportion of copper, while it kept the same nominal value that the rest of silver coins[33]. People accepted the nominal value of these new coins helping the market to have currency for small transactions. The problem with the small silver coins was not solved and they continued being very scare, but the new billon coin served to fill the gap of small coins in the markets.

Nevertheless, this solution was ineffective when the Spanish Monarchy started to use this new currency to increase its revenues during the seventeenth century. In order to get all the possible revenue the Crown minted copper coins without any amount of silver and also reducing its weight. When the 100 percent copper currency invaded the market, people rejected those coins, demanding silver coins or increasing prices of commodities to avoid the copper inflation. Since the 1620s, this inflation during the first years of Philip IV's reign

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30 Hamilton (1988), pp. 51-52.

31 For example, the mint of Mexico capital started to work in 1535. The Monarchy allowed to mint a fifty per cent of coins in "sencillos", a quarter in "reales de a dos" and "de a tres", and the last twenty-five per cent in "medios reales" and "cuartillos". After two years the mint received the permission to coin "plata doble". Gonzalez Gutierrez, (1997), p. 187.

32 Veitia y Linaje (1672), Libro I, Capt. XXX, n. 16.

33 Sargent and Velde (2002), pp. 230-247.

provoked a huge uncertainty about the real value of copper coins and it also affected small transactions.

The value overrated of "plata doble" in the market

Markets preferred large coins not only because they had lower costs in the mint, but also because people gave them a higher value with regard to small denominations. There are several reasons to explain why big coins were so attractive. One of the most important was that bankers used bigger denominations to export silver in order to pay their correspondents in Europe after having lent money to the king.

Bankers and merchants were engaged in larger-scale forms of trade and finance in Europe. It is suppose that their monetary demands and money-changers would be highly biased in favor of larger denomination coins, specially when the higher denomination coins had a much wider circulation in international markets. The costs of manipulate and count big coins was less than the small ones. It permitted to pay big sums easily. Moreover, it avoided the wear or deterioration experienced by small coins.

Many historical evidences show how bankers distinguished very well between different coins when they sent money to Genoa or Flanders. The letters to their correspondents do not only included values but different kind of coins that they were transferring[34].

At the same time, the Monarchy maintained a hard discipline in the monetary system that rejected any change in the weight and fineness of silver coins. It caused an increasing international prestige of his currency, especially the "real de a ocho". Many countries imitated this coin and its fame spread through the world. Given its high value in Europe and in the rest of the world, bankers and their correspondents had another good reason to want these sort of coins instead of any other[35].

The overestimated value that markets gave to large silver coins caused an increase in their rate of exchange ('e') with small coins, initially established by the Monarchy. Legally, 'e' depended only on the amount of silver that each coin had ($e=y1/y2$). But the market increased that value and did it variable over time. That implied that

[34] Archivo Histórico de Protocolos Notariales de Madrid (AHPNM) 4513. p. 390. Registro, 1628.
[35] Vilar (1982), p. 239.

$$ey2 > y1$$

which sets the melt point for small coins bellow that for large, allowing price levels that cause small coins to disappear. But also cause a change in the intervals of minting.

$$ey2(1-S2) > y1(1-S1)$$

The inequality implies that the small denomination coin 1 will not be minted, although the Crown pays the higher cost of issuing small coins in the mint, establishing a real equal cost, S1=S2. The increase of the rate of exchange gave now by the market get worse the scarcity problem of small coins, because now not only the cost of minting small coins was higher, but people gave them less value than large coins. Both effects are strong incentives to mint only large coins.

This effect had an immediate consequence in the Monarchy's budget. Their expenses, especially outside Castile, were paid using foreign bankers´ credit. Bankers wanted to be paid with large coins or to be compensated when they received small ones. From the Crown's point of view, a silver debt in Europe expressed in Castilian maravedis had to be paid with silver in Castile, but the sort of coins used to do it was something indifferent.

It does not have sense to pay an extra compensation when royal officials gave up small silver coins because it means to increase the amount of silver paid or to increase the debt. In that case, it could be more profitable for the Monarchy to pay its debts with raw silver instead of doing it with coins, or at least with small ones. The only inconvenient was that the Crown would lose the seigniorage if the bankers exported the raw silver without being minted in Castile[36].

This higher estimation of "plata doble" increased the price of all credit contracts signed by the Spanish Monarchy automatically whenever the King paid with small coins. The Council of Finance could not control that increase because it depended on the market expectations about large coins. Given the growing and permanent deficit faced by the Spanish Monarchy during the seventeenth century, it was expected that the Council of Finance had to do something to eliminate this problem. However, to take a decision was not so easy. Why?

[36] In 1621 the Council of Finance paid the bankers with raw American silver deposited in the Casa de la Contratación of Seville. The bankers were obligated to mint that metal in the mints of Madrid or Segovia. Archivo General de Indias (AGI) Contratación. leg. 5018. Carta del conde de Salazar a la Casa de la Contratación, 4/01/1621.

If the Crown decided to link the official value of 'e' to the amount of silver in each coin (e=y1/y2), then people had an incentive to buy small coins with big ones in the black market, using the real value of 'e', then to melt the small coins to get the raw metal and after going to the mint to produce new big coins, using in this case the official value of 'e'. Repeating this process many times could threat the stock of small coins.

Another bad consequence for the Crown was that people would prefer to pay their taxes and debts using small coins because the public gained a profit in the difference between the 'e' from open market and the legal or official 'e'. However, the Crown would have to pay its bankers with big ones anyway.

Which was the premium of large silver coins or "plata doble" in Castile?

The preferences for large silver coins are present in many economic documents of Castile during the seventeenth century. The contracts distinguished between "plata doble" and "sencilla" currency: large coins and small change.

For example, when the Monarchy reached an agreement with the Portuguese bankers in August of 1626, the Council of Finance promised to pay 100.000 ducats with "plata doble". The revenues from the first "Donativo" would provide that amount. The contract signed by the bankers specified that if they were paid with billon coins, the Crown had to give them an extra amount to compensate not only the premium necessary to buy silver coins, but also to buy large silver coins or "plata doble"[37].

The "plata doble" is not only cited in the asientos, the big credit contracts signed by the Monarchy and its most important bankers, it is also possible to find in small and private contracts. For instance, the insurance policy of a ship bought in Madrid in 1625 notes that the beneficiary might be paid with "plata doble"[38]. Another example is the sale of a title of public debt. The buyer, a resident from Avila, was obligated to pay the price with "reales of Castilian plata doble, with the same weight, mixture and value" that they had when the contract was signed up, "in spite of the *pragmaticas* and laws that there are o there will be"

[37] AGS CJH 621. Consulta, August 17, 1626.
[38] AHPNM 4511, p. 61. Cesión, February 18, 1625.

against the premium of large coins[39]. In case the buyer could not pay with that kind of currency, the seller had the right to cancel the transaction immediately.

The Council of Finance estimated that the premium of large coins in the marketplace was about 4 or 5 per cent in 1627 and the damages that it was causing to the Crown[40]. The President of the Council of Finance explained it to Philip IV in these terms:

> "I, the *Contador Mayor*, showed to V. Mjd. (the king) the damage caused to the kingdom when the market value of currency coined as one real (1 real) or medium reales (0,5 real) is not the same than the "doble" (8 and 4 reales), being their weight and finesses. And the convenience of forbidding contracts made with equal "plata doble" and the premium that it is necessary to pay when they are accomplished with "sencilla". V. Mjd might avoid signing more contracts distinguishing size of coins for all his expenses and in all his contracts. The whole currency has to be considered just the same"[41].

A second source for calculating this premium used in this paper is a private document with information about some businesses carried out by a Genoese company in Seville during 1624 and 1625. These records have permitted to calculate the extra value of "plata doble" with respect to small coins in that city. It proves that bankers did not make up an artificial extra price when they demanded "plata doble" in their contracts of credit signed with the Spanish Monarchy.

The partners of this company were Juan Esteban de la Torre y Francisco María Pichinotti. Some years later, the second one was among the most important bankers of the Monarchy. Bartolomé Spinola, another important Philip IV's banker, contracted the services of this company in Seville during 1624 and 1625 to collect some amounts of money from the treasurer's office of *Santa Cruzada* in the archbishopric of Seville and in the bishopric of Cadiz, and also to do some payments in Seville. Bartolomé was living in Madrid and he had not enough time to go to the south to attend these businesses by him. The company charged for its work by 0.33 per cent of the total amount collected from the treasurer's offices.

Table 4. Expenses incurred by the company "Juan Esteban de la Torre y Francisco M. Pichinotti". (maravedis)

Concept	Percentage	Silver	Copper
Payment to Vicenço Squarciafico	83,4%	6.000.000	
Transport of money	1,2%	15.130	77.824
Exchange of coins	2,8%	206.332	
Bulls of Toledo in 1625	12,5%	900.000	

39 AHPNM 4511, p. 64. Venta de juro, March 22, 1625.

40 AGS CJH 632. Consulta, August 30, 1627.

41 AGS CJH 632. Consulta, August 30, 1627.

Other expenses	0,1%	4.624	3.026
Total	100%	7.126.086	80.850

Source: AHPNM Protocolo 4511, escritura 19/9/1625

The records of this company show movements in the account of Bartolome' business between March 1624 and August 1625. The expenses of the company during this time were 7.126.086 maravedis of silver and 80.850 maravedis of billon (table 4). The bigger part of this amount, 83,4 percent, was given up to Vicencio Squarzafigo, another king's banker too. The second important expense, a 12,5 percent, was the postage and packing of Cruzada bulls in order to sell them in Toledo during 1625.

Among all the expenses is the cost of exchange 252.724 reales of small silver coins into large ones. It was 206.332 maravedis: 2,4 percent of the total value exchanged and 2,8 percent of the total expenses of the company in this period of time (table 4 and 5).

Table 5. Exchanges of small coins into large coins. (Silver)

Date of exchange	Reales	Rate	Cost (reales)	Cost (maravedis)
No date	9.000	5%	450	15.300
September 1, 1624	74.453	3%	2.233,5	75.942
March 24, 1625	80.900	2%	1.618	55.012
June 16, 1625	88.371	2%	1.767	60.078
Total	252.724		6.068,5	206.332

Source: AHPNM Protocolo 4511, escritura 19/9/1625

Sources neither specify why the company decided to exchange one silver coins for others nor the total percentage exchanged from the total amount collected from Santa Cruzada. One reason could be that some part of the payments in Seville had to be done with large coins. For example, the Cruzada bulls sent to Toledo cost 900.000 maravedis of silver, 676.314 maravedis were paid with small reales and 223.686 maravedis using "plata doble". The account shows that some part of large coins was sent to Madrid. Perhaps, other incentive to exchange silver coins was that Bartolomé needed large ones in the court and Seville was the place more convenient to do it.

The money arrived to Madrid by bills of exchange and messengers. The bills declared what kind of coins were used to buy them because the payer of the bill was obligated to return in Madrid the same currency that he had received in Seville. The company "De la Torre-Pichinotti" bought those bills of exchange to the company "Agustin Centurion and Francisco Serra", who paid a total of 68.500 reales in Madrid, 8.500 of them using large coins.

Table 5 shows that the cost of exchange calculated by the Crown in 1628 was very close to the average value in the free market of Seville. This extra cost concerned very

seriously to the Council of Finance because it could increase the expenses of the Crown every year by the same percentage if the Monarchy did not have large coins available. An average extra cost of 2,5 percent over an estimated budget of 5 million ducats in credits every year supposed an annual increase of 125.000 ducats.

IV. Solutions against the market applied by the Monarchy to solve its monetary problems.

The Crown tried to find a solution for both problems: the scarcity of small coins and overvalue of large ones. The measures that were adopted by the Spanish Monarchy show its ignorance about how its own monetary system worked and its blind confidence that the market would accept any law issued to regulate prices against the market rules. Historical evidence show that markets reacted against those measures as the model presented in Section II had predicted.

In case of scarcity of small coins, the Crown had two choices: first, leaving people free to choose what sort of coin they want to mint. It implied to reduce the amount of small silver coins. But it could bring out other problems with the bankers because during some time there will be small coins with different amount of silver in the market.

Avoiding any change in the intrinsic amount of silver within coins would led to a permanent scarcity of small coins and change in the markets. The second choice was to forbid any premium between large and small coins by law. The Monarchy preferred the second solution even though it was against the market.

Regarding to the "plata doble", the Monarchy did not want to recognize its higher value. This posture was very similar to that adopted with the billon[42]. In that case, the Crown established an official rate of exchange between silver and billon far away from its real value, forcing people to accepted it. The Monarchy earned money each time that paid debts using cooper coins. It was very profitable to sell the silver in the open market using its real price or exporting silver metal outside the country, where its value was higher in terms of goods.

While, on one hand, the Monarchy enforced the laws forbidding any premium over his official rate, on the other hand, the Council of Finance did not fulfill its own laws when it

[42] Álvarez Nogal (2001).

bargained with its bankers to get credits. Simply, the bankers did not accept the legal price of silver in terms of billon[43].

The scarcity of small coins: quotas in the mints

The Crown knew that it was necessary to increase the number of small silver coins in marketplaces in order to stop complains from different social groups, and to incentive commerce specially when copper coins were causing so many problems to people and to the whole Castilian monetary system. The small silver coins could help to increase trade and fiscal revenues.

At the same time, during the 1620's some people extended the idea throughout the court that increasing the number of small coins would help to end with illegal export of silver. Everybody knew that large amounts of coins minted in Seville just after arriving American silver in the fleets every year were exported to Europe. In order to increase the circulation of small coins, the king established quotas of each coin that have to be coined in the mints.

The king was owner of a great amount of American silver, but almost the whole amount was coined in large coins every year because the bankers had to be paid as soon as possible. First, the bankers wanted large coins. Second, minting large coins was faster than issuing small ones. Any delayed in the payments had to be compensated with more interests and the bankers could stop in providing new credits. Third, the Crown did not want to pay the cost of coining small coins, reducing its always-scarce revenues. For all these reasons, the king' silver was exempted of quotas and it continued being minted in "reales de a ocho" and "reales de a cuatro".

The Monarchy decided to enforce the quotas in the private sector[44]. On November 3, 1626 Philip IV ordered to the mints that all private silver from America had to be minted only in small coins. The gold in coins of one escudo, and the silver in three equal parts of "reales

[43] Álvarez Nogal (2001), pp. 25-30.

[44] Similar strategy was used in Flanders in the fifteenth century, Munro (1989), p. 41-42.

de a dos" (2 reales), "sencillos" (1 real) and "medios" (0,5 reales)[45]. However, the Council of Finance realized that it was not so easy to carry out this kind of laws[46].

From the beginning, people put many obstacles to obey this law. The Consulate of Seville complained about the damage that the merchant community would suffer if all its silver were retained in the mint for long time in order to issue only small coins. The mint estimated the value of the silver waiting for being coined in three million ducats. Without this money was difficult to make business in the city and almost impossible to prepare a new fleet to go to America some months later.

As it was showed by the Council of Finance, these complains were not totally true because there was no reason why everybody had to put his precious metal in the mint of Seville. They could deliver the metal among the rest of coin factories in Castile where there was no such awaiting amount. The concentration of all silver in only one mint was a form to force the king to give them up a license to mint large coins, as the solution to accelerate the minting process. Actually, neither the mint, nor people wanted issue the silver in small coins[47]. In this attempt to avoid the law and to put pressure on the king, the "Casa de la Contratación" and the Consulate of Seville, the most important commercial institutions of the city, worked together.

However, the quotas faced a bigger problem related to the bad quality of the coins that finally were coined. The Council of Finance noted soon that new small coins had an important lack of weight. Royal officials carried out an investigation in the mint of Segovia where had been minted one million and a half reales according to the quotas established by law. The investigation showed that the three kind of small coins had problems with their weight.

There was a legal shortage of silver into the coin because it was difficult to get coins exactly equal. It was called "flebe". The same happened if the coin over passed the legal weight. In this case, it was called "fuerte". However, the legal "flebe" allowed was a little bit more than 9 maravedis per mark, and the coins minted in Segovia had much more.

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45 AGS CJH 632. Consulta, May 27, 1627.

46 AGS CJH 632. Consulta, May 27, 1627.

47 AGS CJH 632. Consulta, August 30, 1627.

The report of the Council of Finance showed that: “The best kind of minted coin that was the “sencillos” (1 real) and they have 19 maravedis of “flebe” per mark, which is more than the double allowed, and the “medios reales” have 37,75 maravedis per mark, and the “reales de a dos” 39,8 maravedis per mark”[48].

A similar investigation started in Seville to know what was going on there, but the authorities of the city put so many obstacles to the royal official in charge that he was not able to do almost anything[49]. Maybe the coins had the same problem of Segovia or perhaps the city did not want to mint silver in small coins and they wanted to force the government to change its policy of quotas.

It was clear that merchants and particulars, helped by the workers of the mint of Segovia had compensated the higher cost of minting small coins taking away part of the silver in every coin. The reduction on the amount of silver increased ‘y1’ in the equation (1), as the model predicts. Then, small change was possible. That missing silver was paying the fee charged by the mint when its workers produced small coins.

When the Council of Finance asked to a group of bankers why people rejected to mint small coins in this way, increasing the value of large coins, the bankers gave two reasons. First, the small coins had less size and weight, running out more easily and in less time than the big ones. The lost of silver would be so important in few years that there would be a noticeable difference between old and new small coins.

The second reason was that a smaller coin, the “medio real” (0,5 reales) was equivalent to 17 maravedis and because there were not coins of one maravedí for change, it had to be spent like 16 maravedis, losing one. It meant to give up 6 percent of its nominal value.

In their opinion, even if the Crown insisted on increasing the stock of small coins, as the law had obligated to mint all private silver arrived from America, it would not have any effect over the process of exporting silver to Europe. On one hand, because the main reason why the silver went out Castile was the money borrowed to the bankers by the king in Castile in order to provide funds in other cities of Europe. It must be paid there with silver anyway. On the other hand, if there were not large coins, then they would have to export

[48] AGS CJH 632. Consulta, May 27, 1627.
[49] AGS CJH 632. Consulta, June 27, 1627.

small coins. It would be worse for the Monarchy because then, it would be necessary to pay for the cost of collecting, counting and for their lower value these coins received in other countries. For both reasons, the bankers recommended to the king do not put more obstacles to mint silver in large coins as everybody wanted.

Realizing the counterproductive that could be to force the coinage of small coins, Philip IV decided to relax the law. Two *cedulas* on September 22 and December 11, 1627 changed the quotas in the mint to permit people to coin "plata doble". The new proportion was by 50 per cent as "reales de a dos", by 25 per cent as "reales de a cuatro" and the rest as "sencillos"[50].

The prohibition of premium between small coins and "plata doble"

Other strategy of the Crown regarding "plata doble" was to deny any premium in the value of large coins. Instead of trying to figure out why it was provoked, the Monarchy decided to eliminate this problem by law. The new legislation considered illegal any reference in the contracts to a different value between small and large coins. The Council of Finance established several punishments in case people continued requiring exclusively large coins.

Philip IV and many of the members in the Council of Finance did not want to understand why bankers singled small and large coins out, giving to the large ones an extra value. It was hard to accept when all coins had an equivalent intrinsic value in terms of units of account[51]. It was believed that bankers wanted to take advantage of their dealings with the Monarchy to increase the price of credit without any reason.

The king ordered to the Council of Finance to obligate his bankers to accept all types of coins without asking for any premium. After two meetings with the bankers trying to convince them to eliminate any difference between large and small coins, the proposal was completely rejected. According to the bankers, the high price of large coins was given for the market not for them, and there was no law able to avoid it. Any law trying to do it would be

[50] AGS CJH 632. Consulta, December 19, 1627.

[51] AGS CJH 632 Consulta, August 30, 1627. "Dígame el Consejo, si podrá acabar con los hombres de negocios que reciban esta moneda menuda sin premio, o en qué va el no recivirla, siendo así que tiene el mismo valor intrínsico".

useless "with the essential, although it could seem useful apparently"[52]. It meant that if the premium were not permitted openly, the real different value among coins would have to be paid in other many different ways.

For example, if every coin had the same legal value, debtors always would chose to pay with small coins because there was a real difference in the value. And about the cost of the *asientos*, any attempt to avoid different values between small and large silver coins, it would be reflected in the final cost of credit. If the king did not want to recognize a premium, he would have to pay a higher price in the *asientos.*

The bankers in Castile had to accept the rate of exchange established by their correspondents in Europe, and that price decided the final price of the *asientos.* So, it was the same to pay a premium for large coins or paying an extra cost in the rate of exchange. The only difference was that negotiations would be more complicate, because using small coins would delay transfers of money to Europe, and large coins would disappear faster from the Castile's monetary system. It would be necessary to find them in the black market with more inconveniences and costs.

The prohibition was established in spite of banker's arguments. However, the Monarchy made same exceptions very soon. Months later, Bartolome Spinola, the *Factor General del rey*, a kind of Minister of Finance, got help from the Council of Finance to sell *vasallos*, one of the ways set up by the Crown that year to increase its revenues. Bartolomé wanted to force buyers to pay with "plata doble" "in spite of the law that forbade it". He wanted to suspend the law "in this case, keeping it in the rest of cases"[53]. The Council accepted this exception.

Other example, the *asientos* of the Monarchy for the next years continued having clauses where it was specified the sort of currency that has to be used to compensate bankers, doing a clear reference to "plata doble". Octavio Centurión accepted to provide 800.000 ducats in 1630 and the Council of Finance promised to pay him with large coins[54]. There are many examples like this one.

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52 "en la subtancia, aunque lo parezca en la apariencia".

53 AGS CJH 656. Memorial Bartolome Spinola, 1629.

54 AGS CJH 665. Consulta, December 7, 1629.

Despite of huge historical evidence that the Crown recognized a premium among silver coins in Castile, it did not mean that the prohibition was eliminated. In fact, a new law was issued against the "plata doble" in 1651. Any royal officials accepting differences in the coins would lose their position for four years and be punished with 50.000 maravedis[55].

This policy adopted with the premium of large coins was exactly the same that it was applied to avoid the real premium between silver and billon coins. During many years, the Crown maintained a rate of exchange silver/billon far away from its real market value. The Crown obligated to regular people to accept the official price when they have to receive money from the king, but this official premium was not enforced whenever the Council of Finance bargained with its bankers because it would have blocked any credit negotiation. In this case, the many times the king paid the premium established by the market.

V. Conclusions

The inflation of copper coins without any amount of silver in the monetary system represented a huge problem for the monetary system of Castile during the seventeenth century, but it was not the only one. Circulation of silver coins had its own problems, independently from the invasion of low quality copper coins. In order to understand them, it is necessary to study how the monetary system worked.

Circulation of coins with different nominal values was always something very complicated in any monetary system based on precious metals. The coins in those systems had two different values at the same time: the intrinsic value from the metal which price is regulated in the open market like other commodities, and the nominal value given to the coin by the government. Differences inside the country in both values give the incentive to melt more coins and sell the metal like other commodities or to increase the coining process. On the other hand, if there are different values between the country and their neighbors, it could push the coins or the metal in or out of their territory. This is a hard problem for the monetary system and also for the economy because it can break the equilibrium in the stock of coins continuously.

The first problem studied in this paper was the scarcity of small silver coins in circulation. This problem was solved during the sixteenth century introducing the billon, a

[55] Hamilton (1988), p. 52.

group of coins made with copper and a small amount of silver. The advantage of introducing this type of coin lay in its role as fiat money. Its nominal value would be always higher than its intrinsic value, so it will not allow small change to disappear as it happened with small silver coins. Then, the market could use them for small transactions.

However, when the king of Spain used these coins to increase his revenues in the seventeenth century, eliminating the silver, reducing their weight and increasing their amount, markets rejected their nominal value. People lost its confidence in this sort of money and the real value of copper currency became very unstable. Markets started to reject them because of their high uncertainty. The role played by the billon coins during the sixteenth century in Castile did not work anymore.

It had a direct consequence in everyday transactions and in the whole Castilian economy, doing more difficult to trade, especially goods of small value. Since the 1620s, the Spanish Monarchy realized that in order to replace billon coins as small change in marketplaces was necessary to increase the amount of small silver coins in circulation. Ignoring it, the Monarchy could only expect a reduction of its fiscal revenues, because the majority of them were collected from trade using indirect taxes.

The second problem studied in this paper was the Monarchy's problems to get a regular circulation of small and large silver coins, especially when the Monarchy did not recognize that both types of coins had different values, even though they could have equivalents amount of silver. Historical evidence shows that the different denominations of silver coins received different real and nominal values in the open market of Castile. The paper shows that large silver coins cost between 2 and 5 per cent more than small change. Many contracts presented the value of the transaction in unit of account (maravedis) and they also specified the kind of coins that the debtor had to use in order to pay.

It had an important impact on the revenues of the Monarchy when bankers did not want to accept small silver coins at their official rate of exchange and they asked for large ones. It meant an increase in the cost of its credit in terms of silver. The Monarchy had to pay more amount of silver when payments were done with small coins. Actually, it could be better for the king to pay with raw silver. The drawback in this case was that the Crown could lose the seignorage from coining the silver in Castile.

The Spanish Monarchy faced both problems when the war started in Flanders in 1621. The Spanish Monarchy needed to increase its revenues in Castile and to reduce the price of credit. To avoid problems in its monetary system, the king and his Council of Finance tried to find the fastest and cheapest solution. But, because they did not understand or they did not want to figure out the mechanisms of a bimetallic monetary system, their solutions did not solve the problems.

Sargent and Velde´s model shows that in order to increase the number of small silver coins in circulation, it is necessary to devaluate them, reducing their weight or fineness, while their purchasing power was maintained. Other way to do the same could be to increase their nominal value without changing their quality in terms of silver. These measures would have implied to establish a rate of exchange among denominations independent from their intrinsic amount of silver within each coin, but linked to their value in units of account. Small change would be more like fiat money even though it has been coined with precious metal.

The Spanish Monarchy was not prepared to accept the rules of small change in a metallic monetary system and the king of Spain was not also prepared to use fiat money in a responsible way during the seventeenth century. Fiscal problems in Castile, deficit budgets, suspension of payments and expensive wars did not allow the Monarchy to keep its monetary system outside of its attempts to increase revenues.

The Spanish Monarchy established equal nominal value in term of units of account between large and small silver coins, according their intrinsic amounts of silver. Markets changed the rate of exchange for them, increasing the value of large coins, not because they had more or less silver, but because they had a higher demand in the marketplaces.

Because of the Spanish Monarchy did not want to devaluate any of them, the solutions applied by the Council of Finance were to force people to mint small coins in order to get enough small change, and to set up laws to eliminate any kind of premium on large coins. Great fees and punishments were also established to enforce these laws.

The outcome of this policy was the same predicted by the model used in this paper. First, when the mints were forced to issue more small silver coins, coins were coined with less silver than it was allowed. To avoid this dangerous consequence on the quality of the Castilian currency, the king had to revoke his law few months later, permitting the owners of silver to issue large coins too.

Second, when the Crown forbade the "plata doble" in the contracts and also any premium between large and small silver coins, there were more problems to borrow silver credits from foreign bankers. These agents warned to the Council of Finance that any law against the premium would increase the price of their financial services in Europe and it would do more difficult the negotiations.

To avoid this effect and any other problems with the bankers, the Crown adopted the same strategy used when it had to bargain with them about the premium of copper coins. The strong legislation against any kind of premium was enforced when the Crown had to pay any debt or its creditor was not a very important agent, but the same legislation was forgotten when the king was the creditor or its creditor was a foreign banker. In fact, many asientos and even private contracts continued forcing the king to pay with large silver coins. If the royal officials did not have enough, they used raw silver to avoid conflicts about the real value of small silver coins.

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